CLAIMS

1. A rotor for a synchronous machine comprising:

a rotor core having a rotor axis;

a pair of super-conducting coil windings mounted on the rotor core, each of said coil windings in a respective plane that is parallel to and offset from the rotor axis.

2. A rotor as in claim 1 wherein the super-conducting coils have a race-track shape.

3. A rotor as in claim 1 wherein the super-conducting coils each have a pair of opposite side sections that are parallel to the rotor axis and an pair of end sections adjacent to an end of the rotor core.

4. A rotor as in claim 1 wherein the rotor core has recessed surfaces extending longitudinally along the rotor core and said recessed surfaces receive the coil windings.

5. A rotor as in claim 1 wherein the super-conduction coils are included a high temperature super-conducting (HTS) wire extending around the entire coil.

6. A rotor as in claim 1 further comprising tension rods extending between and connecting the coil windings.

7. A rotor as in claim 1 further comprising tension rods extending between and connecting the

coil windings, and extending through conduits in the rotor core.

8. A rotor as in claim 1 further comprising tension rods extending between and connecting the coil windings, and wherein said tension rods are perpendicular to the respective planes of the coils.

9. A rotor as in claim 1 wherein the rotor core is an iron core body.

10. A rotor as in claim 1 wherein the rotor core includes a ridge separating the coil windings.

11. A rotor as in claim 1 further comprising tension rods spanning and connected to opposite side sections of each coil, and tension rods spanning and connected to both of said coils.

12. A rotor as in claim 1 wherein the coil windings are on opposite sides of the rotor axis, and an equal distance separates the plane for each of said coil windings and the rotor axis.

13. A rotor as in claim 1 wherein the planes for each of said coil windings are parallel to each other, and the rotor axis is between said planes.

14. A rotor as in claim 1 wherein the coils are saddle coils.

15. A rotor as in claim 14 further comprising saddle coil housings that each bracket side sections of both coils.

16. A rotor for a synchronous machine comprising:

a rotor core having a rotor axis and recessed surfaces extending longitudinally along the rotor core;

a first and second super-conducting coil windings mounted on the rotor core, each of said coil windings being in a plane that is parallel to and offset from the rotor axis;

a plurality of first tension rods spanning and connecting opposite side sections of each of said coil windings, and

a plurality of second tension rods spanning between and connecting both of the coil windings.

17. A rotor as in claim 16 further comprising a plurality of channel housings each supporting a section of the side section of said coil winding and connected to an end of one of said first tension rods and one of said second tension rods.

18. A rotor as in claim 17 wherein the channel housing form a housing covering the side section entirely.

19. A rotor as in claim 17 wherein the first and second tension bars each extend through respective conduits in the rotor core.

20. A rotor as in claim 16 wherein the coils are saddle coils.

21. A rotor as in claim 20 further comprising saddle coil housings that each bracket side sections of both coils.